



September 2017

# PERSONAL FIREARMS

## Programs that Promote Safe Storage and Research on Their Effectiveness

Accessible Version

# GAO Highlights

Highlights of [GAO-17-665](#), a report to congressional requesters

## Why GAO Did This Study

According to data from CDC, an agency within the Department of Health and Human Services (HHS), among children under age 18, there were over 6,900 nonfatal firearm injuries seen in U.S. emergency departments and nearly 1,500 firearm-related deaths in 2015. CDC data also indicate that, across all ages, suicide accounted for about 61 percent of all firearm-related deaths in 2015. While safe firearm storage practices—such as keeping guns secured with a cable lock, or in a gun safe—reduce the risk of firearm injuries, estimates indicate that over one-quarter of household firearms are stored loaded and half of these are not kept locked.

GAO was asked to identify programs related to gun access and provide information on the effect of such programs. This report addresses (1) what is known about public and nonprofit programs that promote the safe storage of personal firearms at the national and local levels, and (2) the extent to which safe storage programs have been studied and the results of the research.

GAO interviewed officials at HHS and the Departments of Interior, Justice (DOJ), and Veterans Affairs (VA). GAO conducted a literature review related to safe firearm storage and interviewed researchers that it selected based on its firearm safety research and representatives of organizations sponsoring safe storage programs.

GAO provided a draft of this report to HHS, Interior, DOJ, and VA. Interior, DOJ, and VA did not provide comments. HHS provided technical comments which GAO incorporated as appropriate.

View [GAO-17-665](#). For more information, contact Marcia Crosse at (202) 512-7114 or [crossem@gao.gov](mailto:crossem@gao.gov).

September 2017

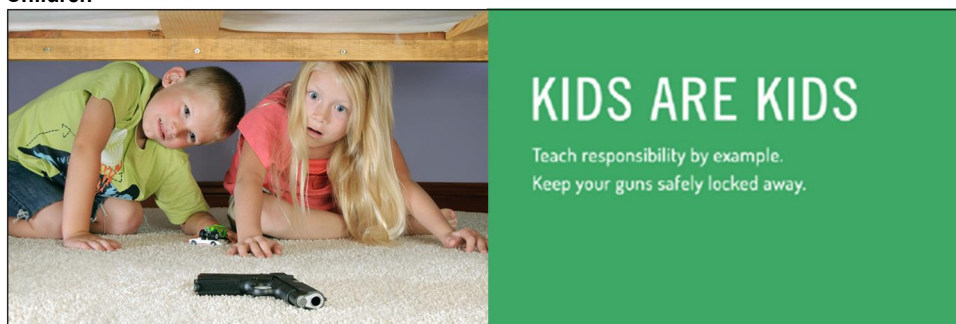
## PERSONAL FIREARMS

### Programs that Promote Safe Storage and Research on Their Effectiveness

## What GAO Found

GAO identified 16 public or nonprofit programs that promote the safe storage of firearms on the national and local levels. These programs primarily involved education efforts through media campaigns and partnerships in the community. For example, the Bulletproof Kids program provides safe storage information to parents and assists pediatricians in discussing firearm safety with patients. (See figure.) Additionally, the New Hampshire Firearm Safety Coalition created partnerships among diverse perspectives to further a common goal of preventing firearm injuries and deaths through safe storage. This partnership helped the Coalition distribute suicide-prevention materials in gun shops statewide. In addition to education, four of the programs that GAO identified distributed free safe storage devices to gun owners. For example, the National Shooting Sports Foundation's "Project ChildSafe" has distributed 37 million free safety kits that include a firearm locking device, across the United States.

#### Bulletproof Kids Campaign Material Promoting the Need to Safely Store Firearms Away from Children



Source: Bulletproof Kids. | GAO-17-665

Program officials and researchers indicated that safe storage, as with other gun safety issues, has not been extensively studied. They cited a federal appropriations restriction on the Centers for Disease Control and Prevention's (CDC) use of funds to advocate or promote gun control as one explanation. GAO identified 12 studies that evaluated locking device distribution or physician counseling programs from GAO's literature review, as well as from discussions with researchers. These studies found that free lock distribution efforts influenced behavior to store firearms more safely, but these results were largely based on self-reports. Studies evaluating physician consultation presented mixed results. Some found that counseling in pediatric primary care visits did not change parents' storage behavior, but emergency care consultation following an adolescent psychiatric crisis did prompt parents to store firearms safely. In addition to these studies, GAO found that, of the 16 safe storage programs it identified, three evaluated aspects of their programs' effectiveness. The other 13 programs had not evaluated their effectiveness, but some provided data on the distribution of locking devices or educational materials.

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## Abbreviations

ATF	Bureau of Alcohol, Tobacco, Firearms, and Explosives
BJA	Bureau of Justice Assistance
CDC	Centers for Disease Control and Prevention
Interior	Department of Interior
DOJ	Department of Justice
FBI	Federal Bureau of Investigation
FWS	Fish & Wildlife Service
HHS	Department of Health and Human Services
NIH	National Institutes of Health
NIJ	National Institute of Justice
NRA	National Rifle Association
NSSF	National Shooting Sports Foundation
RFID	radio frequency identification
VA	Department of Veterans Affairs

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VHA

Veterans Health Administration

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September 19, 2017

## Congressional Requesters

Over 100 organizations representing health care providers consider the number of firearm injuries and related deaths that occur each day to be a serious public health epidemic. Researchers have found that having a firearm in the home is a risk factor for injuries and deaths, including suicides, among adults and children alike.<sup>1</sup> While household firearms can pose a danger to anyone, the inherent curiosity of children makes them particularly susceptible to harm from an unsecured firearm.<sup>2</sup> According to the latest data from the Centers for Disease Control and Prevention (CDC), there were approximately 85,000 individuals seen in emergency departments in the United States for firearm-related injuries in 2015, with children under the age of 18 accounting for 6,900 of these injuries.<sup>3</sup> CDC data also indicate that there were more than 36,000 firearm-related deaths in 2015, almost 1,500 of which involved children. In addition, nearly two-thirds of all firearm-related deaths in 2015 were suicides.

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<sup>1</sup>For example, see D. J. Wiebe, "Homicide and Suicide Risks Associated with Firearms in the Home: A National Case-Control Study," *Annals of Emergency Medicine*, vol. 41, no. 6 (2003).

<sup>2</sup>Diverse organizations agree that children's curiosity about firearms can be dangerous. See [http://www.aacap.org/AACAP/Families\\_and\\_Youth/Facts\\_for\\_Families/FFF-Guide/Children-And-Firearms-037.aspx](http://www.aacap.org/AACAP/Families_and_Youth/Facts_for_Families/FFF-Guide/Children-And-Firearms-037.aspx); <http://www.projectchildsafe.org/safety/safe-storage>; <http://www.seattlechildrens.org/safety-wellness/guns-in-the-home/>, all accessed on June 26, 2017.

<sup>3</sup>In this report, we define "children" as individuals under age 18. Estimates of firearm-related injuries and deaths are from CDC's Web-based Injury Statistics Query and Reporting System. These estimates are from 2015, which is the most recent year such data are available.

Several surveys and studies have reported estimates that firearms are present in 32 to 39 percent of households in the United States.<sup>4</sup>

Many organizations agree that firearms should be properly stored to prevent access by unauthorized users. For example, the American Academy of Pediatrics and the National Shooting Sports Foundation (NSSF) both recommend that firearms be stored unloaded, locked, and separate from locked ammunition. According to some studies, gun owners who practice safe storage are less likely to incur firearm-related injury or death by accidental and self-inflicted means.<sup>5</sup> Yet, one study estimated that over one-quarter of household guns are stored loaded, and half of these are not kept locked.<sup>6</sup>

You asked us to identify public and nonprofit programs that raise awareness about firearm access and storage practices and provide information on the effectiveness of such programs. This report addresses:

- 1) what is known about public and nonprofit programs that promote the safe storage of personal firearms at the national and local levels; and
- 2) the extent to which safe storage programs have been studied and the results of the research.

To examine what is known about programs that promote safe storage of personal firearms at the national and local levels, we interviewed officials

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<sup>4</sup>We identified estimates of households with firearms from nationally representative surveys conducted by the Gallup Poll, the General Social Survey, and Pew Research Center. The Gallup Poll estimated that 39 percent of respondents reported a firearm in the home in 2016, while the General Social Survey and Pew Research Center found that 32 percent and 33 percent of respondents, respectively, reported household firearms. These survey estimates are similar to estimates in some of the studies we identified. For example, one study, estimated that nationally, 32.6 percent of adults reported that firearms were kept in or around their home. See Okoro, C. A., et al., "Prevalence of Household Firearms and Firearm-Storage Practices in the 50 States and the District of Columbia: Findings from the Behavioral Risk Factor Surveillance System 2002," *Pediatrics*, vol. 116, no. 3 (September 2005).

<sup>5</sup>Shenassa, E. D., et al., "Safer Storage of Firearms at Home and Risk of Suicide: A Study of Protective Factors in a Nationally Representative Sample," *Journal of Epidemiological Community Health*, vol. 58 (2004).  
Rowhani-Rahbar, A., Simonetti, J. A., and Rivara, F. P., "Effectiveness of Interventions to Promote Safe Firearm Storage," *Epidemiologic Reviews*, vol. 38 (2016).

<sup>6</sup>Miller, M. "One Third of Households in the USA Own Firearms which Are Often Stored Unsafely," *Evidence-Based Healthcare & Public Health*, vol. 9 (2005).

at four federal agencies that support programs or research related to the safe storage of firearms and firearm safety, as well as agencies that collect data related to firearm injuries and deaths.<sup>7</sup> Specifically, we interviewed officials from the Department of Health and Human Services (HHS), the Department of the Interior (Interior), the Department of Justice (DOJ), and the Department of Veterans Affairs (VA). Within HHS, we interviewed officials at CDC and analyzed data on nonfatal firearm injuries and firearm deaths, including firearm-related suicides from its Web-based Injury Statistics Query and Reporting System. This reporting system is an interactive database that provides fatal and nonfatal injury, violent death, and cost of injury data from a variety of sources.<sup>8</sup> While data from this system have known limitations, it is the federal government's leading source for death and injury data.<sup>9</sup> We assessed the reliability of this data by interviewing CDC officials about their systems, and reviewing literature that assessed the quality of the data, and found it reliable for our purposes. In addition, we interviewed officials at the National Institutes of Health (NIH). We also interviewed researchers, experts in the field of firearm safety, and representatives from 22 organizations that either conduct research or have programs related to safe firearm storage, including nonprofit organizations, academic institutions, and a county government. We selected these organizations based on our research of firearm safety programs as well as referrals from experts in the field. These organizations reflect diverse perspectives, including public health concerns and firearm ownership rights. (See app. I for a list of the organizations that we contacted.) In addition to interviews, we reviewed these organizations' websites and documentation, such as educational materials, related to their efforts to promote safe storage.

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<sup>7</sup>In this report, we focus on the safe storage of personal firearms. We excluded the storage of service firearms, such as those used by law enforcement officers and military forces, from our review.

<sup>8</sup>The Web-based Injury Statistics Query and Reporting System collects data from sources such as the National Vital Statistics System and the National Electronic Injury Surveillance System, All Injury Program.

<sup>9</sup>Recognized limitations of data on deaths from the Web-based Injury Statistics Query and Reporting System include the possibility for misclassification of the intent of the death. Data on individuals with non-fatal firearm injuries are also limited in that they do not directly record all injuries, but are derived from a nationally representative sample of 66 hospitals in the United States. The National Electronic Injury Surveillance System, All Injury Program, which is the source of the injury data that we reviewed, first started providing a full year of data in 2001. Thus, earlier data are not available.



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To examine the extent to which safe storage programs have been studied and the results of the research, we asked the officials from the 22 organizations that we interviewed about their efforts, if any, to evaluate their respective programs. We also conducted a literature review to determine what is known about the effectiveness of different types of programs that promote the safe storage of personal firearms. To identify existing studies, we searched reports from government agencies, medical associations, and research organizations, as well as trade publications and peer-reviewed journals. Using search terms that included the words “firearm,” “gun,” and “storage,” we searched various social science databases, such as Scopus, ProQuest, and Social SciSearch, which provide access to abstracts and citations of peer-reviewed literature.<sup>10</sup> We also searched Policy File Index, which offers access to foreign and domestic policy papers and gray literature, as well as OCLC’s Worldcat, which is a worldwide library catalog.<sup>11</sup> We did not limit our searches by publication date, but excluded literature that provided safe storage examples outside the United States. We performed these searches from June 2016 to November 2016 and identified 120 studies. Most of these studies were descriptive studies that related to firearm prevalence, as opposed to safe firearm storage. To further refine our focus on evaluations of safe storage approaches and to assess the methodological quality of the selected studies, we examined summary level information about each piece of literature, and identified studies that were germane to such evaluations. We then examined the methodologies of identified studies and determined that the studies were sufficiently reliable for the purposes of our report, and then summarized the research findings. As a result, we identified eight studies through our literature review that met

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<sup>10</sup>Scopus is the largest abstract and citation database of peer-reviewed literature, scientific journals, books and conference proceedings. ProQuest is the common name of a group of databases that provide scholarly journals, newspapers, reports, working papers, and datasets along with digitized historical primary sources and over 450,000 ebooks. The Social SciSearch database is an international, multidisciplinary index to the literature of the social, behavioral, and related sciences.

<sup>11</sup>Policy File Index allows access to reports from over 350 public policy think tanks, nongovernmental organizations, research institutes, university centers, advocacy groups, and other entities from 1990 – current. Gray literature is the general name for non-formally published scholarly literature or substantive information that is produced by researchers and practitioners in particular fields of study. Gray literature is produced by government agencies, universities, corporations, research centers, associations and societies, and professional organizations. OCLC stands for “Online Computer Library Center, Inc.,” which is a global library cooperative that provides shared technology services, original research and community programs for its membership and the library community at large.

our criteria for relevance and methodological quality.<sup>12</sup> We supplemented this list with eight additional studies that also met our criteria. We identified these additional studies through our discussions with federal officials and researchers, or from citations included in studies we obtained through the literature review, but which were not directly identified through the literature review itself.

We conducted this performance audit from May 2016 to September 2017 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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## Background

According to research, following safe firearm storage practices—such as keeping guns unloaded and locked with ammunition locked separately—reduces the likelihood of injuries and deaths by preventing unauthorized adults and children from accessing or using the firearm.<sup>13</sup> Some studies have found that adherence to safe storage principles can decrease the number of suicides, particularly those committed impulsively, as well as unintentional shootings involving children.<sup>14</sup> However, it is unclear how many of these injuries and deaths—which represent a portion of all firearm injuries and deaths—could actually be prevented through the use of safe storage practices.

Various organizations have raised different perspectives on what constitutes safe firearm storage depending on factors such as an individual's personal circumstances, purpose for having the firearm, and

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<sup>12</sup>We included studies that evaluated the effectiveness of programs related to storage of personal firearms and excluded studies that related to firearms used for law enforcement and the military.

<sup>13</sup>See Shenassa, E. D., "Safer Storage of Firearms at Home and Risk of Suicide: A Study of Protective Factors in a Nationally Representative Sample," and Rowhani-Rahbar, A., "Effectiveness of Interventions to Promote Safe Firearm Storage."

<sup>14</sup>D. C. Grossman et al., "Gun Storage Practices and Risk of Youth Suicide and Unintentional Firearm Injuries," *Journal of the American Medical Association*, vol. 293, no. 6 (2005); Shenassa, "Safer Storage of Firearms at Home and Risk of Suicide."

when they consider it to be “in-use.” For example, some gun owners who keep a firearm for personal or home defense may consider it in use at all times. Thus, from this perspective having the firearm unloaded and locked affects its availability for immediate protection. In contrast, other gun owners may keep a firearm for a discrete activity and therefore may have distinctly defined periods of when it is in use, such as, when owners are hunting.

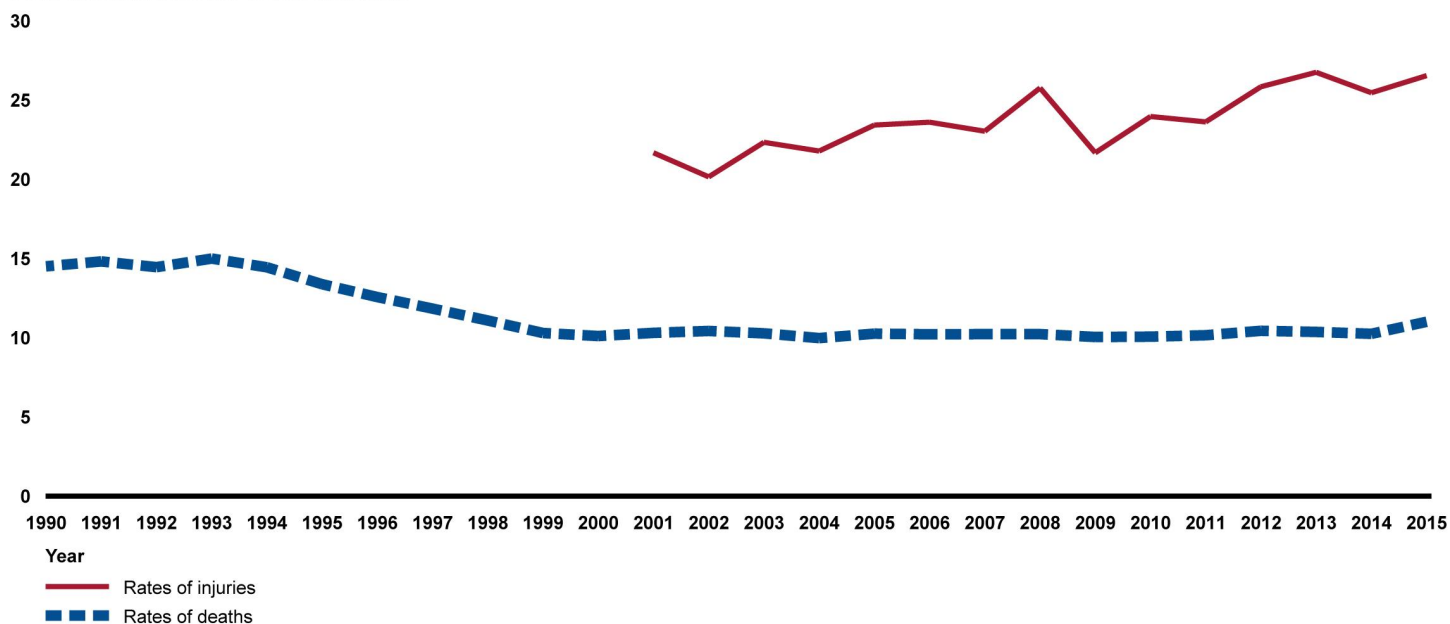
Firearm-related deaths are currently among the top five causes of death for individuals under the age of 65 in the United States.<sup>15</sup> According to CDC data, overall firearm-related death rates decreased from 1993 to 2000, but have remained relatively stable since then. Data on individuals who sustained nonfatal firearm-related injuries show that from 2001 to 2015, the rates for these injuries were approximately twice the rates of firearm-related deaths. (See fig. 1.)

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<sup>15</sup>CDC reports that these firearm deaths and injuries are estimated to result in over \$48 billion in medical and work loss costs each year. See Fowler, K.A., Dahlberg, L.L., Haileyesus, T., Annest, J.L., “Firearm Injuries in the United States” *Preventive Medicine*, vol. 79 (2015).

**Figure 1: Age-adjusted Rates of Firearm-Related Deaths and Non-fatal Injuries in the United States, 1990 through 2015**

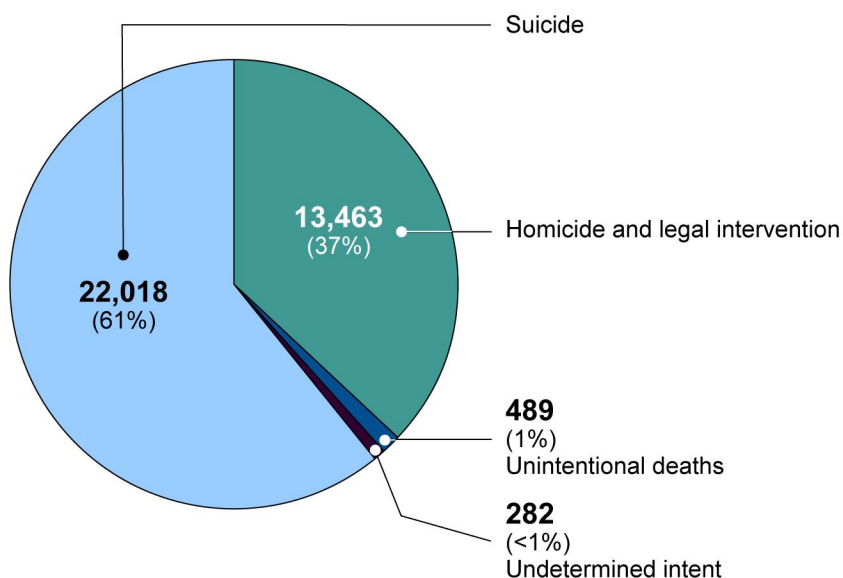
Death and injury rates per 100,000 individuals



Source: Centers for Disease Control and Prevention (CDC). | GAO-17-665

Note: Data on age-adjusted rates of firearm-related deaths and non-fatal firearm-related injuries treated in U.S. emergency departments were obtained from CDC's Web-based Injury Statistics Query and Reporting System. The injury data are from the National Electronic Injury Surveillance System, All Injury Program, which first started providing a full year of data in 2001. Thus, injury data before this date are not available. Additionally, the injury data are derived from a nationally representative sample of 66 hospitals in the U.S.

CDC data also indicate that most of the firearm-related deaths were due to suicide. Of the 36,252 firearm-related deaths in 2015, about 61 percent (22,018) were suicides. (See fig. 2.)

**Figure 2: Firearm-related Deaths in the United States by Manner of Death, 2015**

Source: Centers for Disease Control and Prevention (CDC). | GAO-17-665

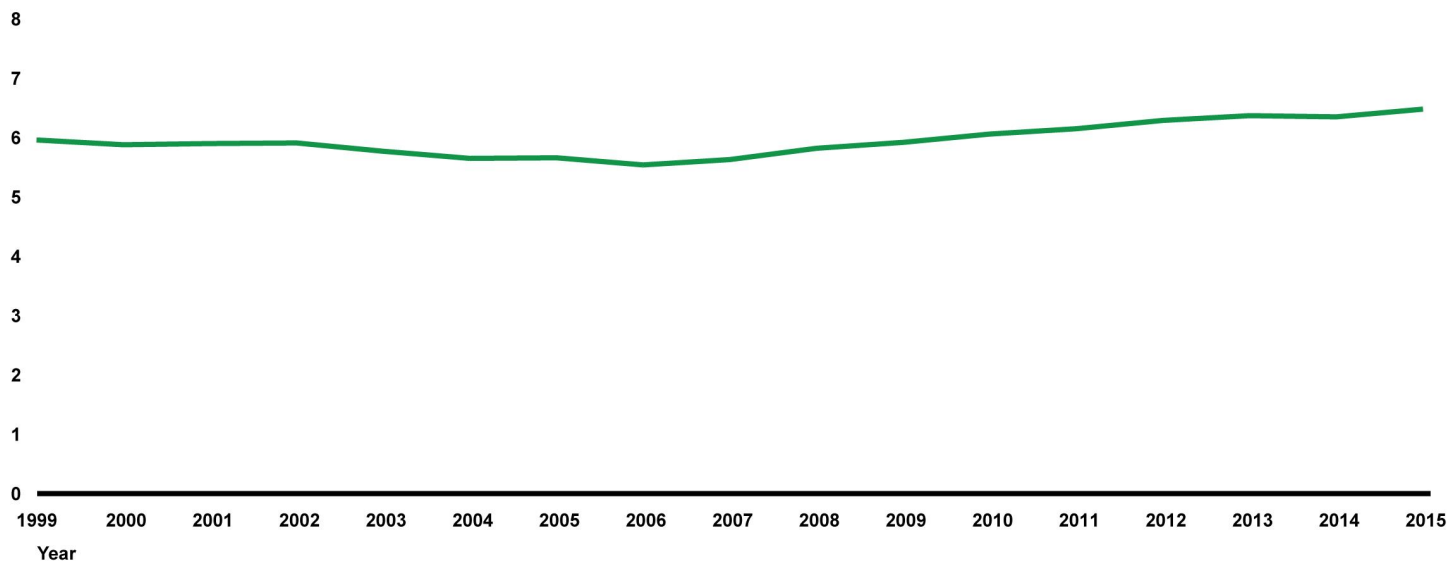
Note: Data on firearm-related deaths were obtained from CDC's Web-based Injury Statistics Query and Reporting System.

Firearms are also the most commonly used means in suicides, and were used in approximately half of all suicides in 2015. CDC data also indicate that firearm-related suicide rates decreased from 1990 to 2006, but then increased every year since then to 2015.<sup>16</sup> (See fig. 3.)

<sup>16</sup>Research that examined the accuracy of classifications of unintentional deaths in the National Violent Death Reporting System and the Vital Statistics System from 2003 to 2006 found that firearm-related suicides may be underreported due to misclassification of the cause of these deaths. See Barber, C. Hemenway, D., "Too Many or Too Few Unintentional Firearm Deaths in Official U.S. Mortality Data?" *Accident Analysis and Prevention*, vol. 43, issue 3 (May 2011).

**Figure 3: Age-adjusted Rates of Firearm-related Suicides in the United States, 1999 through 2015**

Suicide rates per 100,000 individuals



Source: Centers for Disease Control and Prevention (CDC). | GAO-17-665

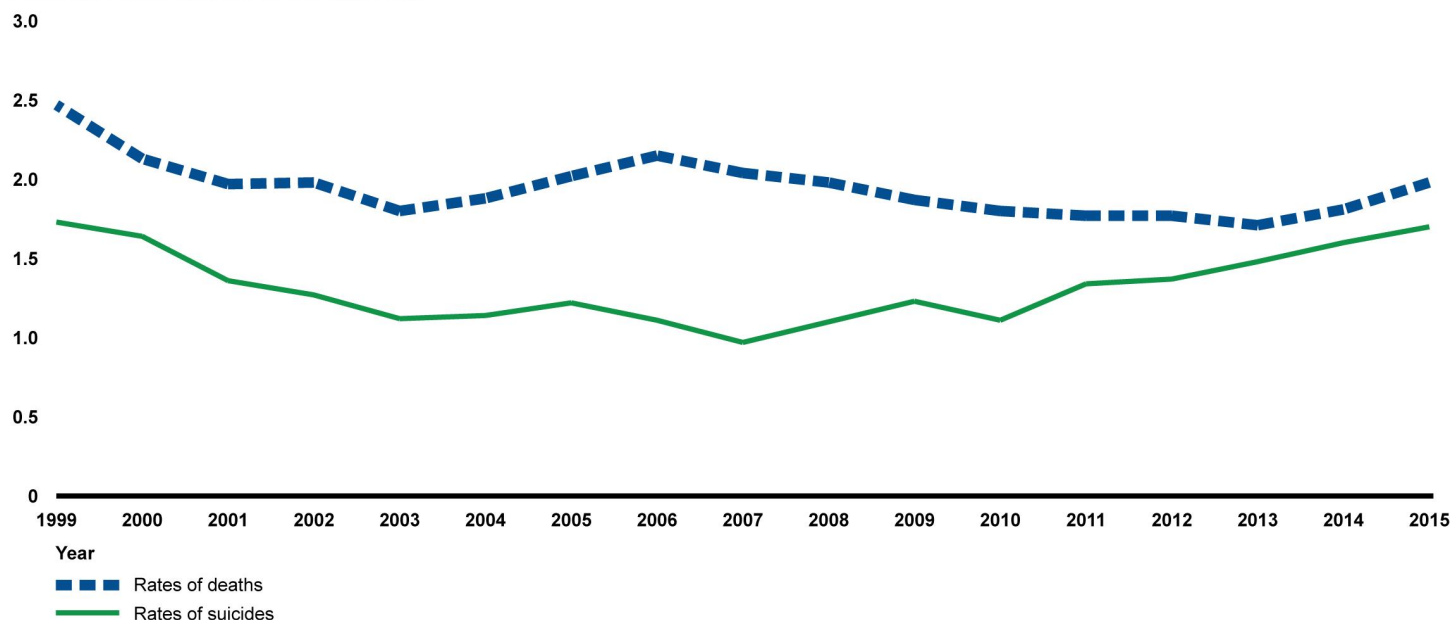
Note: Data on age-adjusted rates of firearm-related suicides were obtained from CDC's Web-based Injury Statistics Query and Reporting System.

For children under the age of 18, CDC data indicates that in 2015, there were 1,458 total firearm-related deaths for children—with nearly 40 percent (566) of them due to suicide.<sup>17</sup> The rate of child suicides by firearm showed a downward trend from 1999 to 2007, but then an upward trend since then. (See fig. 4.)

<sup>17</sup>CDC's suicide data are based on children aged 10 to 17. According to CDC, suicide is rare in children under the age of 10—its data identified 6 cases nationally from 1999 to 2015. CDC officials also pointed out that experts in the field have determined that children under 10 years may not be developmentally capable of forming suicidal intent. Additionally, in 2015, over 6,900 children were seen in U.S. emergency departments for nonfatal firearm injuries.

**Figure 4: Rates of Firearm-related Deaths and Suicides in Children, Under Age 18, in the United States, 1999 through 2015**

Death and suicide rates per 100,000 individuals



Source: Centers for Disease Control and Prevention (CDC). | GAO-17-665

Note: Data on firearm-related death and suicide rates were obtained from CDC's Web-based Injury Statistics Query and Reporting System. Firearm suicide rates are based on children aged 10 to 17 years. Apart from suicide being rare in children under the age of 10, experts in the field use this age as a lower boundary since children under 10 years may not be developmentally capable of fully forming suicidal intent.

Some research that examined storage practices in homes found that many households keep firearms loaded and unlocked. For example, one study that assessed firearm storage patterns across the country in 2002, found that although household firearms were less likely to be stored loaded or loaded and unlocked in homes with children, approximately 1.69 million children were living in homes with loaded and unlocked firearms.<sup>18</sup> A second study that reviewed articles published between 1992 and 2002, similarly found that firearms in households with children were stored slightly more securely than households without children.<sup>19</sup> However, it also found that over 25 percent of households kept firearms loaded, and only half of these loaded firearms were kept locked. A third

<sup>18</sup>See Okoro, C. A., et al., "Prevalence of Household Firearms and Firearm-Storage Practices in the 50 States and the District of Columbia: Findings From the Behavioral Risk Factor Surveillance System, 2002," *Pediatrics*, vol. 116, no. 3, (September 2005).

<sup>19</sup>Miller, M. "One Third of Households in the USA Own Firearms."

study found that approximately 1.4 million homes, with about 2.6 million children, did not store firearms safely based on a 1994 survey—approximately 1 million higher than the first study because it also included firearms that were stored unloaded, but unlocked with ammunition.<sup>20</sup> While these studies include estimates from 15 years ago, they provide the most recent storage data that we identified and insight on past storage practices. Since that time, it is estimated that the number of firearms in households has increased, but we did not identify more recent estimates of safe storage practices.<sup>21</sup>

There are a variety of locking devices that can be used to store or disable firearms.<sup>22</sup> The devices vary in cost and design. For example, some devices are placed on the firearm to prevent pulling of the trigger, thus disabling it, while others prevent access to the firearm entirely by storing it in a locked container. (See fig. 5.)

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<sup>20</sup>See Schuster, M., et al., "Firearm Storage Patterns in US Homes with Children," *American Journal of Public Health*, vol. 90, no. 4, April 2000.

<sup>21</sup>A more recent study estimates that from 1994 to 2015, the number of firearms owned by civilians has grown by 70 million firearms, to approximately 270 million. See Azrael D., Hepburn L., Hemenway D., Miller M., "The Stock and Flow of US Firearms: Results from the 2015 National Firearms Survey," *The Russell Sage Foundation Journal of the Social Sciences*. Forthcoming.

<sup>22</sup>In addition to devices that can be used to disable or secure a firearm, some organizations recommend removing firearms from the home, either permanently or temporarily, as another approach to preventing unauthorized access to them.



Figure 5: Examples of Firearm Locking Devices

## Cable Lock



A cable lock is placed through the gun chamber or magazine well to prevent loading and firing. It is unlocked with a combination or key.

Price range: \$10 to \$50

## Trigger Lock



A trigger lock goes through the trigger guard behind the trigger, preventing the trigger from being pulled. It can be unlocked with a push-button keypad, combination or key.

Price range: \$5 to \$35+

## Firearm Safe



Firearm safes vary in size and level of protection with some large enough to store rifles and shotguns as well as handguns. Safes may have a key, combination lock, or digital keypad.

Price range: \$100 to \$2,000+

## Lock Box



Lock boxes are small safes that use a key or combination lock. Some lock boxes use a digital keypad or biometric sensors, such as fingerprint readers, so that they may be opened quickly.

Price range: \$40 to \$200+



Source: Ad Council and Department of Public Health, Seattle and King County, Washington (images); Bulletproof Kids (pricing estimates). | GAO-17-665

Related to the safe storage of firearms is the development of gun safety technologies, sometimes referred to as “smart guns” or “personalized guns,” which are intended to prevent unauthorized users from accessing or discharging a firearm. Although some of the officials we spoke with indicated that such firearms are not a substitute for storing a firearm safely, some researchers believe that these technologies may in the future help to reduce the number of firearm suicides and other firearm-

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related deaths. For more information on these technologies, including initiatives to encourage their development, see app. II.

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## National and Local Safe Firearm Storage Programs Largely Focused on Education, with Some Distributing Locking Devices

We identified a variety of programs that support the safe storage of personal firearms. Some were national campaigns, while others were organized at the local level. Most of these programs focused on educating the general adult population, although some were directed at physicians on how to counsel parents of their pediatric patients about firearm safety and storage. In addition to educating, some of these programs distributed locking devices, such as cable locks.

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### Safe Storage Programs Varied From National Campaigns to Local, Community Efforts

Of the four federal agencies and 22 organizations that we contacted, we identified 16 with programs that promote the safe storage of firearms.<sup>23</sup> Some of these efforts were national campaigns promoting messages about storing firearms safely and some were developed with support from a federal agency.<sup>24</sup> For example, the National Crime Prevention Council, which is a nonprofit organization, created the “Lock It Up” campaign to disseminate public service announcements through the Internet,

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<sup>23</sup>Some of the 22 organizations that we contacted—such as the Joyce Foundation/Fund for a Safer Future—did not have a safe storage program, but fund research related to safe storage and firearm safety. Other organizations were academic institutions that similarly did not have a safe storage program, but conducted research in this field. See app. I for a list of the organizations that we contacted.

<sup>24</sup>Federal efforts through DOJ and HHS to promote safe firearm storage primarily consist of funding nonprofit organizations to implement programs, while the VA administers its own safe storage campaign. See app. III for a list of other federal efforts related to firearm safety.

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television, radio, and billboards.<sup>25</sup> The “Be SMART” campaign—developed by the nonprofit Everytown for Gun Safety—similarly uses the Internet to distribute its materials, but it also partners with national organizations, such as the Parent Teacher Association, to reach parents of school-aged children. NSSF, which administers a program called “Project ChildSafe,” established partnerships throughout the country to distribute its firearm safety materials in all 50 states and five U.S. territories. Even though the “Lock It Up” and “Be SMART” campaigns are nationally focused, officials at both organizations said the campaigns have local aspects to further distribute their messages at a grassroots level. For example, an official at the National Crime Prevention Council indicated that as part of its campaign’s media efforts, it participates in interviews with local radio stations. Officials at Everytown for Gun Safety told us that they distribute their materials at community events and meet with local officials, such as law enforcement. According to these officials, their efforts to meet with a police chief in a New Jersey county resulted in the police department agreeing to distribute “Be SMART” materials with every gun permit issued.

Other safe storage campaigns and programs that we identified focused their efforts at the local level. For example, King County, Washington created the “Lok-It-Up” campaign to educate and promote safety in its communities. Included in this campaign’s materials is a listing of retailers in Washington where residents can purchase a locking device and receive a discount when mentioning the campaign. The campaign’s website also informs residents that gun safes and lock boxes are tax-exempt in Washington. Similarly, the Arizona Firearm Injury Prevention Coalition has a local focus that concentrates on preventing firearm injuries and deaths by providing education to local organizations and health providers, such as the Arizona Chapter of the American Academy of Pediatrics and the Phoenix Children’s Hospital. An official from “Bulletproof Kids” said that the program also promotes safe storage locally by providing posters and brochures to physicians’ offices and by putting up billboards along busy streets. This program’s website includes

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<sup>25</sup>The National Crime Prevention Council created the “Lock-It-Up” campaign in conjunction with the Bureau of Justice Assistance within DOJ and the Ad Council, a private, nonprofit organization that develops campaigns and public service announcements for other nonprofit organizations or federal government agencies. This campaign was developed in response to a directive contained in the January 2013 White House policy document entitled: *Now Is the Time: The President’s Plan to Protect Our Children and Our Communities by Reducing Gun Violence*.

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videos with local partners, such as a police chief, to further its message of the importance of storing a firearm safely.

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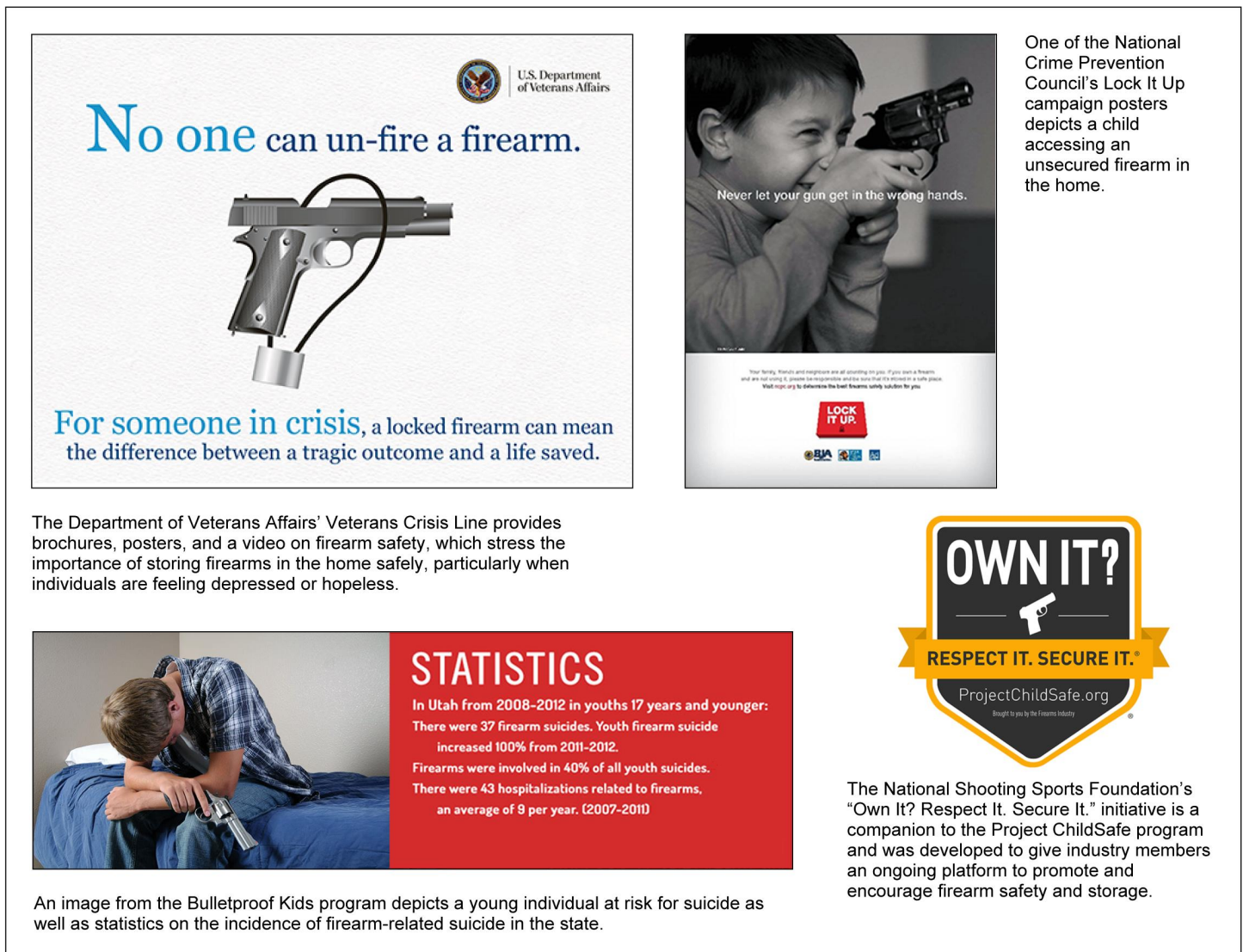
## Safe Storage Programs Focused on Educational Efforts; Some Distributed Locking Devices

Each of the 16 programs that we identified developed and disseminated safe storage educational materials that teach the importance of safely storing a firearm. Program materials generally recommended that firearms be stored unloaded, locked, and separate from locked ammunition and provided information on different locking devices—such as a cable lock, lock box, or gun safe—that can be used to secure a firearm. Materials often included information, such as images of locking devices and, in some cases, the cost of these devices. They also target information to specific populations that may be particularly affected by an unsecured firearm, like children, and individuals at risk of suicide. For example,

- The National Crime Prevention Council’s “Lock It Up” campaign and Everytown for Gun Safety’s “Be SMART” campaign include messages about how parents try to protect their children from household hazards, such as medicines or swimming pools, and that a household firearm should be considered similarly hazardous and therefore should be secured as well.
- The “Be SMART” and the Brady Center to Prevent Gun Violence’s “Asking Saves Kids (ASK)” campaign also educate parents on the need to ask about whether other homes that their children may visit have unsecured firearms.
- VA also has educational materials geared to its population. For example, literature and a video developed for the Veterans Crisis Line offer a reminder that, while veterans may be well versed in firearm safety, their families may not be. As such, VA recommends that household firearms be locked and kept secure during chaotic, stressful times, such as when someone is impaired by drugs or alcohol or a family member is depressed or feeling hopeless.
- “Suicide-Proof Your Home,” developed by a partnership between the Rhode Island Department of Health and the Brady Center, educates parents about steps they can take to reduce the risk that a youth suicide will occur in their home. To do so, parents are counseled to securely lock or remove lethal means, such as firearms, from the home. Related to youth suicide, the “Bulletproof Kids” materials

include statistics on the number of youth suicides and injuries related to firearms to convey the impact of an unsecured firearm in the state. (See fig. 6.)

**Figure 6: Images from Various Safe Firearm Storage Campaign Materials**



Source: Bulletproof Kids, the Department of Veterans Affairs, the National Crime Prevention Council, and the National Shooting Sports Foundation. | GAO-17-665

We also identified educational materials that show physicians how they can speak to the parents of their pediatric patients about safe firearm storage and firearm safety generally. For example, American Academy of

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Pediatrics officials told us that the topic of firearm storage has been added to the “Bright Futures” curriculum, which is a protocol funded by the Health Resources and Services Administration, an agency within HHS, to provide guidance to physicians that care for children and adolescents at routine pediatric appointments.

The safe storage educational materials that we identified were all directed to adults, but varied in how the information was conveyed to them. For example, nearly all of the programs that we contacted used the Internet to convey their materials to parents and to gun owners directly, but some programs used organizational partners, gun shop retailers, and medical providers to help disseminate educational materials:

- Organizational Partnerships: Several of the organizations we contacted said they used partnerships across the country or in the community to distribute their materials and to build support for their programs. For example, NSSF officials indicated that they have partnerships with over 15,000 communities to distribute their safety materials, and they recently launched a nationwide suicide prevention and firearms education program in partnership with the American Foundation for Suicide Prevention. Recognizing that many individuals have strong beliefs about firearms, officials from some organizations, such as the New Hampshire Firearm Safety Coalition, said it was important to bring diverse firearm perspectives together with a goal that all could agree on—preventing firearm injuries and deaths. As such, officials from this organization and the Harvard Injury Control Research Center’s “Means Matter” Campaign indicated that the partnerships they developed with firearm safety and suicide-prevention groups, gun shop owners, sportsman clubs, and advocates have supported their educational efforts about suicide prevention and safe storage. These officials added that gun rights groups are well-suited to bring forward messages of firearm safety and safe storage and that their efforts have resulted in such collaborations in 21 states. Additionally, the Brady Center partnered with the American Academy of Pediatrics and the National PTA, to promote “ASK Day 2017”—which served to remind parents and caregivers of the importance of asking if there are unlocked firearms in homes where children play.
- Gun Shop Retailers: New Hampshire Firearm Safety Coalition’s efforts to engage local gun shop owners are part of its “Gun Shop Project,” where shops in the state distribute firearm storage and suicide-prevention information to their customers. This approach, however, has not been feasible in other areas. While officials in King County’s “Lok-It-Up” program said they wanted to follow the New

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Hampshire coalition's model, they reported that gun shop owners in Seattle were not receptive to distributing suicide-prevention information to their customers because they thought it would convey a negative connotation on their product.

- Medical Providers: In addition to The American Academy of Pediatrics' efforts to educate parents through pediatricians using their "Bright Futures" curriculum, other organizations also provided safe storage materials to local medical providers to reach their patients. For example, the Arizona Firearm Injury Prevention Coalition provides safe storage materials to pediatricians and hospitals in the state, such as the Phoenix Children's Hospital. This coalition also conducts presentations at these hospitals that include information on the statistics of firearm injuries and deaths, safe handling and storage of firearms, and other related topics. Additionally, last year the San Francisco VA Health Care System hosted a conference that focused on educating mental health providers about counseling veterans at risk for suicide on safe storage of firearms and other lethal means. Some of the organizations we contacted indicated that educating health care providers, who may be uncomfortable raising the issue of firearms with their patients, enables the providers to reach their patients. According to officials at the American Academy of Pediatrics, in addition to being uncomfortable, some physicians reported that they are not clear on their rights to counsel patients on firearms in light of some state laws that restrict what they may ask.<sup>26</sup>

We also found two organizations that developed firearm safety programs geared toward children. The National Rifle Association (NRA) has developed the "Eddie Eagle GunSafe Program," which is a firearm accident prevention program that seeks to teach children from pre-kindergarten through fourth grade what to do if they encounter an unsecured firearm. This program provides curriculum materials, such as

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<sup>26</sup>According to American Academy of Pediatrics officials, some pediatricians are confused about what they are legally allowed to ask in light of some state laws that restrict physician communication related to firearms. For example, Florida enacted a law in 2011 to, among other things, restrict doctors and other health care providers from asking about gun ownership unless the information is relevant to medical care or safety. This provision of the law was challenged and most recently overturned by the United States Court of Appeals for the Eleventh Circuit. Officials at the National Law Center to Prevent Gun Violence told us that Minnesota, Missouri, and Montana also have state laws that limit what providers can ask or record in medical records regarding household firearms. American Academy of Pediatrics officials told us that they are working with their membership to clarify what they can discuss with patients regarding the presence of firearms in the home.

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instructor guides by age that can be used by law enforcement agencies, schools, hospitals, day care centers, or libraries to teach children about firearm safety. The “Eddie Eagle GunSafe Program” specifies four steps that children should take if they find a firearm: stop, do not touch the firearm, run away from it, and tell an adult about the firearm. The program also provides other items, such as child activity books, student reward stickers, and a web video, that can be used to reinforce this message. The National Center for the Prevention of Community Violence followed the NRA’s model by developing a state-specific program in Virginia public schools, called “Finnegan Fox.” For the “Finnegan Fox” program, this organization worked with the Virginia Department of Education to develop the “Elementary School Gun Safety Guidelines and Curriculum” for kindergarten through fifth-grade classrooms. These guidelines include lesson plans by grade, suggested scripts, and student materials. Similar to NRA’s safety steps, the “Finnegan Fox” curriculum specifies that children encountering a firearm at home, school, or in the community should “Leave it Alone, Leave the Area, Let an Adult Know.”

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## Distribution of Safe Storage Devices

Four of the programs we identified also distribute safe storage devices, such as cable locks, trigger locks, and lock boxes to the public, health providers, law enforcement, or others at no cost to the recipient. For example, NSSF’s “Project ChildSafe” program provides cable locks to the public as part of a free gun safety kit distributed through law enforcement departments and VA medical centers. Additionally, NSSF officials reported that they have partnered with the state of Utah to distribute trigger locks as a part of the state’s firearm safety courses. An official from the Arizona Firearm Injury Prevention Coalition indicated that the organization also distributes free cable locks throughout Arizona, but does not supply them directly to the public. Rather, it provides them to organizations in the state—such as the children’s hospital, the human services office, and the Arizona Department of Health Services, as well as the Arizona Chapter of the American Academy of Pediatrics—that pass them along to pediatricians, according to this official. A “Bulletproof Kids” official also said that the program distributes free firearm cable locks at health fairs and to physicians’ offices to pass along to their patients. Additionally, Seattle Children’s Hospital hosts large-scale trigger lock and lock box giveaway events at sporting goods stores around the state. According to Seattle Children’s Hospital officials, the goal of these events is to increase access to, and teach proper use of, safe gun storage devices. These officials added that they bring 350 lock boxes and 50



trigger locks to distribute, and that each event participant receives hands-on training on how to use the device, as well as the opportunity to practice using it. Averaging about four events per year and with each event costing about \$20,000 to coordinate, officials reported that it is difficult to procure funding to expand the program or host more events. (See fig. 7.)

**Figure 7: Image from a Trigger Lock and Lock box Distribution Event Sponsored by Seattle Children's Hospital**



Source: Seattle Children's Hospital. | GAO-17-665

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## While Research and Evaluations of Programs Are Limited, Some Studies Suggest Lock Distribution May Encourage Safer Firearm Storage

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### There is Relatively Little Research on Safe Firearm Storage; However Some Studies Indicate that Lock Distribution Efforts May Be Promising

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Researchers and officials from some federal agencies we spoke with said that safe storage, as with other gun safety issues, has not been widely studied, citing, as primary reasons, a lack of funding and data. On the funding issue, CDC officials and a researcher pointed to a federal appropriations restriction on CDC's use of funds to advocate or promote gun control. The restriction, commonly known as the Dickey Amendment, was first enacted in 1996 and has been re-enacted in subsequent appropriations acts, with the scope extended to cover all HHS agencies beginning in fiscal year 2012.<sup>27</sup> CDC officials said that after the restriction was enacted, the agency interpreted it as a prohibition of activities related to gun control advocacy, but not as a restriction of activities that supported firearm injury-related data collection and scientific research. However, CDC officials added that the agency has limited its firearm-related research over time because, in 1997, its budget was reduced by an amount equal to what the agency had spent on such research, and because it learned that further reductions were possible if the research continued. Although the National Institutes of Health (NIH), another HHS agency, became subject to this appropriations restriction in 2012, NIH officials stated that from their perspective, this did not preclude the agency from funding firearm research. NIH continues to have a broad research portfolio that supports violence prevention, including firearm safety. Nevertheless, NIH officials stated that funding instability has limited firearm research throughout the research community. Officials at

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<sup>27</sup>See Omnibus Consolidated Appropriations Act, 1997, Pub. L. No. 104-208, 110 Stat. 3009, 3009-244 (1996), which specified "that none of the funds made available for injury prevention and control at the Centers for Disease Control and Prevention may be used to advocate or promote gun control." See also Consolidated Appropriations Act, 2012, Pub. L. No. 112-74, § 218, 125 Stat. 786, 1085 (2011), which extended this restriction to other HHS agencies, including the National Institutes of Health in 2012.

DOJ cited a similar perspective, noting that, as the primary agency supporting this type of research, DOJ has had difficulty funding a consistent body of work in this field. Further, they said that there are a small number of individuals who have sufficient expertise.

Several researchers we spoke with discussed funding challenges and their implications. A researcher from the University of Washington cited a lack of funding as the biggest challenge in this field and remarked that the number of funding announcements related to firearm research is extremely low when compared with announcements for research on cancer, HIV, or other public health issues. A researcher from Northeastern University noted that private foundations are the primary funders for firearm research, though not many organizations have stepped in to fill the gap in funding. As such, this researcher added that the limited research has inhibited the growth of experts in this field because researchers seek stable funding sources for their work. A researcher from the Harvard Injury Control Research Center said that he discourages new students from firearm research exclusively because they will not be able to make a living in that research area alone. He added that he has needed to work on other public health issues, such as obesity, because there is currently more funding in that area.

While agency officials and researchers in the field told us about the lack of funding related to firearm research, a recent analysis that appeared in the *Journal of the American Medical Association* quantified this assertion by comparing firearm-related research to research for other leading causes of death.<sup>28</sup> Citing CDC's statistic of over 30,000 firearm-related fatalities annually, this analysis sought to assess whether funding and publication of firearm research are disproportionately low relative to the mortality rate associated with firearms. The analysis mapped CDC death statistics for the top 30 causes of death in the United States with conditions or diseases from a publications database and funding data from a NIH database of federal grants.<sup>29</sup> The analysis found that research on firearms receives disproportionately low funding and has fewer

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<sup>28</sup>See D.E. Stark and N.H. Shah, "Funding and Publication of Research on Gun Violence and Other Leading Causes of Death," *Journal of the American Medical Association*, vol. 317, no. 1 (2017).

<sup>29</sup>The article indicates that CDC-derived causes of death were manually mapped to their corresponding Medical Subject Heading term(s) and queried in MEDLINE, a biomedical journal article database, for studies between 2004 and 2015. Additionally, the researchers used research funding data from NIH's Federal RePORTER database.

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publications compared to other top causes of death. For example, the analysis noted that there were a comparable number of deaths related to firearms as related to sepsis—which is a potentially life-threatening complication of an infection. However, funding for firearm research was about 0.7 percent of that for sepsis and the volume of publications was about 4 percent of that for sepsis. While sepsis is a very different health concern than firearm-related deaths, the study also found less funding and fewer publications for firearms than comparable injury-related causes of death, such as motor vehicle accidents and poisonings. In contrast, the analysis showed funding levels and numbers of publications related to influenza and pneumonia and heart disease research that were commensurate with the considerable number of deaths associated with these conditions.

Some of the researchers we spoke with also cited a lack of data as another reason why firearm-related injuries and deaths are not well studied. For example, researchers at Northeastern University and Harvard cited CDC's Behavioral Risk Factor Surveillance System as a prior, but limited, effort to collect national and state-specific data on the presence of firearms in homes. This system collects data on health-related risk behaviors, among other things, through telephone surveys; however, the researchers noted that it has not included questions related to firearm safety and storage for all states since 2004.<sup>30</sup> According to CDC, the system collected data about the presence of firearms in homes across all states three times—in 2001, 2002, and 2004—and it assessed storage practices in two of these years.<sup>31</sup> States, however, can voluntarily add these questions for their residents at the state's expense. According to officials in Washington's King County's "Lok-it-Up" program, Washington and New Mexico have periodically added these questions. However, CDC officials told us that state coordinators for the Behavioral

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<sup>30</sup>The Behavioral Risk Factor Surveillance System collects state data about United States residents through health-related telephone surveys in all 50 states as well as the District of Columbia and three U.S. territories—interviewing over 400,000 adults as part of the effort each year. The questionnaire contains three parts: 1) the core component, 2) optional modules, and 3) state-added questions.

<sup>31</sup>CDC officials indicated that prior to the 2000s, the Behavioral Risk Factor Surveillance System included optional modules with firearm questions in its surveys from 1995 to 1998. Officials added that each year, system coordinators from state and territorial health departments decide which questions to include on the core survey as well as proposed optional modules. With the exception of the question on safety belts, state coordinators voted to drop all injury questions—such as drinking and driving, and firearm safety—from the annual survey in 2004 to allow for the inclusion of questions on other health topics.

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Risk Factor Surveillance System approved an optional firearm module for inclusion in the 2017 survey. The proposal to include an optional module was based on recommendations from the Institute of Medicine and federal partners about ways to strengthen data systems available for firearm research.<sup>32</sup>

From 120 results in our literature review, and additional research, we identified 12 studies that evaluated one of two safe storage approaches: locking device distribution efforts and physician consultation of firearm storage with patients. An additional four studies analyzed the effectiveness of interventions to promote safe behaviors in children when they come across an unsecured firearm. The remaining studies from the literature review often related to firearm prevalence as opposed to storage of firearms, and were either descriptive or contained evaluations not focused on safe storage. Our review of the studies relating to safe storage approaches (device distribution and physician consultation) found that providing a free locking device to study participants influenced behavior to store firearms more safely and physician consultation generally did not. While some of these studies were limited by small sample sizes or a focus on a specific population, other recently published research supports this conclusion as well.<sup>33</sup> In a 2016 study, researchers conducted a systematic review that found that the provision of free locking devices improved storage practices.<sup>34</sup> Our review found:

**Locking Device Distribution:** Five of the 12 studies that we identified evaluated the effectiveness of efforts to provide free firearm locking devices such as a cable lock, trigger lock, or gun safe/cabinet. All five studies found that gun owners given a locking device began using the device to store their firearms more safely compared to a control group or based on surveys given before and after receiving the device. Three of these five studies used self-reported data on participants' use of the

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<sup>32</sup>On July 1, 2015, the Institute of Medicine became known as the National Academy of Medicine.

<sup>33</sup>Some of the studies that we identified used a small sample size, which means that results may not be generalizable to a larger population. Additionally, some of the studies relied on self-reported data, which may be subject to bias due to participants wanting to provide socially desirable responses. Some of these studies tried to overcome these limitations by using a control group and conducting direct observation.

<sup>34</sup>Rowhani-Rahbar, A., et al. "Effectiveness of Interventions to Promote Safe Firearm Storage."

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device,<sup>35</sup> while two of the studies directly observed that participants were actually using the device.<sup>36</sup> In particular:

- Self-reported data: In one study, researchers conducted a national, randomized control trial of 137 pediatric practices and distributed educational materials and cable locks to parents of some patients and not to others.<sup>37</sup> The researchers relied on self-reported data that was collected by following up with study participants. After 6 months, researchers contacted participants who had received the educational materials and cable locks and found that they reported an increase (from 59 percent to 68 percent) in use of the cable locks since they received them. Over the same period of time, the percentage of respondents in the control group, who did not receive these devices, reported that their use of cable locks decreased from 64 percent to 52 percent.
- Direct observation: In another study, researchers delivered free metal gun cabinets to 255 households in six villages in western Alaska.<sup>38</sup> Rather than relying exclusively on self-reported information from study participants, the researchers directly observed that participants began using the cabinets given to them to store their firearms. Study participants were separated into two groups—one received their cabinets at the start of the study, and the other following the first assessment. Researchers later conducted unannounced visits to participants' homes at 12 and 18 months after the installation of the cabinets. In the group that first received their cabinets, researchers found that the rate of homes containing unlocked guns dropped from

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<sup>35</sup>Barkin S. L., et al., "Is Office-Based Counseling about Media Use, Timeouts, and Firearm Storage Effective? Results from a Cluster-Randomized, Controlled Trial," *Pediatrics*, vol. 122, no. 1 (2008); Carbone, P.S., C.J. Clemens, and T.M. Ball, "Effectiveness of Gun-safety Counseling and a Gun Lock Giveaway in a Hispanic Community," *Archives of Pediatrics and Adolescent Medicine*, vol. 159, (2005); Coyne-Beasley, T., V.J. Schoenbach, and R.M. Johnson, "Love Our Kids, Lock Your Guns: A Community-based Firearm Safety Counseling and Gun Lock Distribution Program," *Archives of Pediatrics and Adolescent Medicine*, vol. 115, no. 659-664 (2001).

<sup>36</sup>Grossman, D. C., et al., "Improving Firearm Storage in Alaska Native Villages: A Randomized Trial of Household Gun Cabinets," *American Journal of Public Health*, vol. 102, no. S2 (2012); and Horn, A., et al. "Community Based Program to Improve Firearm Practices in Rural Alaska," *Injury Prevention*, vol. 9, no. 231-234, (2003).

<sup>37</sup>Barkin S. L., et al. "Is Office-Based Counseling about Media Use, Timeouts, and Firearm Storage Effective? Results from a Cluster-Randomized, Controlled Trial."

<sup>38</sup>Grossman D.C., et al. "Improving Firearm Storage in Alaska Native Villages: A Randomized Trial of Household Gun Cabinets."

95 percent to 35 percent at the 12-month visit. Additionally, the percentage of homes that kept ammunition unlocked also dropped from 89 percent to 36 percent over the same time frame. Further, researchers observed very little change in behavior among participants who had not yet received the storage cabinet and kept firearms and ammunition unlocked at the 12-month visit. This group began showing safe behaviors with firearms and ammunition similar to the first group after they were given the gun safes, which researchers observed during the 18-month visit.

**Physician Consultation:** Seven of the 12 studies that we identified evaluated the effectiveness of physicians' efforts to encourage patients to store their guns safely through counseling and, in some cases, providing written educational materials.<sup>39</sup> The overall results of these studies were mixed—with four finding little or no benefit to the physician intervention, and three finding some increase in safe storage behaviors among the groups who received counseling. The effectiveness of physician counseling also varied based on the setting and type of physician who administered the counseling. These studies examined interventions in the primary care, mental health clinic, and emergency care settings.

- **Primary Care Setting:** Four studies found that physician consultation had little or no effect on changing patient behavior to store firearms more safely. Three of these studies targeted patients through pediatric primary care settings. For example, one of these three studies included nearly 1,300 households divided into a control group and an intervention group.<sup>40</sup> Households in the intervention group that did not

<sup>39</sup>Albright, T.L. and S.K. Burge, "Improving Firearm Storage Habits: Impact of Brief Office Counseling by Family Physicians," *Journal of the American Board of Family Practice*, vol. 16, no. 1 (2003); Brent D.A., et al., "Compliance With Recommendations to Remove Firearms in Families Participating in a Clinical Trial for Adolescent Depression," *Journal of the American Academy of Child and Adolescent Psychiatry*, vol. 39, no. 10 (2000); Grossman D.C. et al., "Firearm Safety Counseling in Primary Care Pediatrics: A Randomized, Controlled Trial," *Pediatrics*, vol. 106, no. 1 (2000); Kruesi, M.J.P., et al., "Suicide and Violence Prevention: Parent Education in the Emergency Department," *Journal of the American Academy of Child and Adolescent Psychiatry*, vol. 38, no. 3 (1999); Oatis, P.J., et al., "Pediatric Practice Based Evaluation of the Steps to Prevent Firearm Injury Program," *Injury Prevention*, vol. 5, no. 48-52 (1999); Runyan, C.W., et al., "Lethal Means Counseling for Parents of Youth Seeking Emergency Care for Suicidality," *Western Journal of Emergency Medicine*, vol. 17, no. 1, (2016); Stevens, M.M., et al., "A Pediatric, Practice-based, Randomized Trial of Drinking and Smoking Prevention and Bicycle Helmet, Gun, and Seatbelt Safety Promotion," *Pediatrics*, vol. 109, no. 3, (2002).

<sup>40</sup>Grossman D.C., et al. "Firearm Safety Counseling in Primary Care Pediatrics: A Randomized, Controlled Trial."

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own a firearm were advised against buying one, while households that owned firearms were advised to remove them from the home as the safest approach for the family. Households that were not willing to remove the firearms were advised to store them unloaded and locked. These households were also given a folder with safety materials and a coupon for a storage device. Three months following the intervention, the researchers mailed a survey to all households and found no statistically significant differences between the control group and the intervention group. According to this study's results, the intervention group was no more likely to remove a firearm from the home or purchase a safe storage device than were households in the control group.

- Mental Health Clinic Setting: One study was conducted by mental health professionals and social workers in a mental health clinic as part of a clinical trial.<sup>41</sup> The study, which offered therapy to 107 adolescents between the ages of 13 and 18 with major depressive disorder and counseling to their parents, found that encouraging the parents to remove firearms from the home was not effective. Participants reported whether or not they owned a firearm through surveys administered following a three-month therapy phase and at two years following therapy. At the end of therapy, 99 families participated in the survey. Of the 26 families that owned firearms, 7 families (26.9 percent) removed firearms from the home, while the remaining 19 did not. Of the 73 families that did not previously own firearms, 4 families (5.5 percent) acquired at least one, while the remaining 69 did not. During a two-year follow-up in which 95 families responded, including 25 of the 26 families that initially owned firearms, 9 families (36 percent) no longer kept firearms in the home, while 12 (17.1 percent ) of the 70 families that did not own firearms had acquired one. Researchers noted that including additional safe storage options during counseling beyond removing the firearms altogether, may help to improve compliance.
- Emergency Care Setting: Two studies took place in an emergency care setting and involved mental health professionals or emergency department staff counseling parents or guardians of patients at risk for suicide to prevent access to lethal means, such as firearms and medications that could be used to commit suicide. These studies

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<sup>41</sup>Brent D.A., "Compliance With Recommendations to Remove Firearms in Families Participating in a Clinical Trial for Adolescent Depression."



showed a positive change in safe storage behaviors.<sup>42</sup> For example, one study counseled parents or guardians of patients who were aged 12 to 17 and received psychiatric care for suicidal ideation. For the 52 counseled families that reported they had firearms in the household, researchers followed up with 33 of them and learned that two-thirds had kept all firearms locked in their home prior to the counseling intervention. However, during the follow-up telephone interviews after the intervention, the study found that all parents reported that all firearms in the home were kept locked.

**Child Education:** Our literature review identified four additional studies that were not directly related to safe storage, but evaluated efforts to educate children on how to respond if they encounter an unsecured firearm. Three of these studies involved behavioral skills training featuring instructor demonstrations that taught children the ideal safe behaviors—which were generally to not touch the firearm, leave the area, and tell an adult. The fourth study included lessons on making good decisions and understanding conflict in addition to some behavioral skills training. All four studies found that behavioral skills training did not instill consistent safe firearm habits in young children.<sup>43</sup> For example, one study of 4- and 5-year-old children placed them in two groups to compare the effectiveness of two different child safety courses.<sup>44</sup> This comparison included testing the children in both groups in different scenarios with firearms after five training sessions and providing feedback based on the children's behavior. The study found that most children of both groups were able to verbally recall the safety message. However, on average, the children in both groups did not leave the area or tell an adult when they found a gun during the assessment. One of these four studies focused on slightly older children (6- and 7-year-olds) and found better

<sup>42</sup>Kruesi, M.J.P., et al. "Suicide and Violence Prevention: Parent Education in the Emergency Department," Runyan, C.W., et al. "Lethal Means Counseling for Parents of Youth Seeking Emergency Care for Suicidality."

<sup>43</sup>Hardy, M.S., et al. "A Firearm Safety Program for Children: They Just Can't Say No," *Developmental and Behavioral Pediatrics*, vol. 17, no. 4 (1996); Hardy, M.S., "Teaching Firearm Safety to Children: Failure of a Program," *Developmental and Behavioral Pediatrics*, vol. 23, no. 2 (2002); Himle, M.B., et al., "An Evaluation of Two Procedures for Training Skills to Prevent Gun Play in Children," *Pediatrics*, vol. 113, no. 1, (2004); Miltenberger, R. et al., "Evaluating Behavioral Skills Training with and without Simulated In Situ Training for Teaching Safety Skills to Children," *Education and Treatment of Children*, vol. 32, no. 1 (2009).

<sup>44</sup>Himle, M.B., et al. "An Evaluation of Two Procedures for Training Skills to Prevent Gun Play in Children."

retention of firearm safety principles among those receiving training with simulated situations.<sup>45</sup> However, intensive training was needed to achieve that result. In this study, researchers placed 43 children into three groups. Each group went through several rounds of training and then assessment until all desired behaviors were repeated. At the start of the study, one group received behavioral skills training, another received training with simulated situations, and a third group—the control group—did not receive any initial training.<sup>46</sup> Following the first round of training and assessment, and each subsequent assessment, all three groups were given additional training with simulated situations. After instructor assessments and additional training, it ultimately took three rounds of training before all of the children in the simulated situations training group exhibited the safe responses, and four rounds of training for the behavioral skills training group to achieve a comparable outcome. Most, but not all—88 percent—of the children in the control group achieved the desired result.

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### Few Safe Storage Programs In Our Review Evaluated Their Effectiveness

Most of the 16 programs that we identified that provided safe storage education, and in some cases free locking devices, had not evaluated their safe storage efforts, but many were able to assess the reach of their programs. Three of the 16—Seattle Children’s Hospital, the “ASK Campaign,” and “Bulletproof Kids”—evaluated aspects of their programs through surveys to determine the program’s effect on their local populations.

To determine whether its lock box and trigger lock giveaway events increased the use of safe gun storage devices, Seattle Children’s Hospital surveyed participants in three of their giveaway events in 2015 and 2016 both before providing the devices and again at about 4 to 6 weeks. Surveying 206 of 415 participants that had received a free locking device from the program, researchers asked how participants stored their

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<sup>45</sup>Miltenberger, R., et al. “Evaluating Behavioral Skills Training with and without Simulated In Situ Training for Teaching Safety Skills to Children.”

<sup>46</sup>Program instructors provided training over multiple rounds and assessed the children each round. An instructor assessment found that after the first round of training, all desired responses were shown by 27 percent of the basic skills group, 17 percent of the simulated situations group, and 6 percent of the control group.

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firearms and ammunition, as well as storage preferences. Finding that nearly 13 percent of respondents began storing their firearms locked and unloaded, with ammunition locked as well, the researchers concluded that Seattle Children's intervention improved safe firearm storage practices among participants.<sup>47</sup> Additionally, researchers also learned that differences in participant preferences for devices suggest that a "one-size-fits-all" approach may be insufficient to influence population-level storage practices, as intended.

Researchers published a study in 2012 that evaluated the effectiveness of a yearlong implementation of the Brady Center's "ASK campaign," which encourages parents to ask about the presence of unsecured firearms in homes that their children may visit.<sup>48</sup> The researchers selected two Midwestern cities, similar in size and demographics—Rockford, Illinois (the intervention city), and Joliet, Illinois (the control city). The intervention city was exposed to the campaign and the control city was not. The campaign delivered messages through various media, including billboards, radio, and newspapers. It also involved local officials and community-based groups that participated in hosting events and distributing campaign materials. Researchers conducted 1,600 telephone surveys in the intervention city and the control city, both before and after the campaign to examine the effect the campaign had on parental behavior.<sup>49</sup> After the campaign, 7 percent of respondents in the intervention city had heard of the "ASK campaign" and knew it was about firearm safety compared to less than 1 percent in the control city. The percentage of respondents who said they were likely to ask about household firearms in the future increased slightly in the intervention city (72 to 75 percent) but not in the control city (70 to 69 percent). However, the percentage of respondents who had ever asked about the presence of firearms in homes their children visit decreased slightly in the intervention city (33 percent to 31 percent) but increased slightly in the

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<sup>47</sup>Simonetti, J., Rowhani-Rahbar, A., King, C., Bennett, E., Rivara, F., "Evaluation of a community-based safe firearm and ammunition storage intervention," *Injury Prevention*, June 22 2017, accessed July 18, 2017. <http://injuryprevention.bmj.com/content/early/2017/06/22/injuryprev-2016-042292>.

<sup>48</sup> See Johnson, R.M., Lintz, J., Gross, D., Miller, M., and Hemenway, D., "Evaluation of the ASK Campaign in Two Midwestern Cities," *International Scholarly Research Network*, vol. 2012.

<sup>49</sup>This evaluation cited limitations to the research such as its limited generalizability because it addresses experiences in two midsized cities and evaluates short-term effects of the campaigns.

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control city (26 to 31 percent). This suggests that expressed intentions to ask about the presence of firearms do not always translate to changes in behavior. Of respondents in the intervention city after the campaign, those who had seen or heard the campaign's message were significantly more likely to have asked about firearms in homes their children visit than respondents who had not seen or heard the campaign's message (40 percent compared to 26 percent).

On a smaller scale, the "Bulletproof Kids" program—which aims to educate pediatricians about talking to the parents of their patients about safe storage—evaluated whether physicians in the area were familiar with the program and whether it affected the way that they counseled the parents of patients about firearms in the home. To do so, a program official surveyed members of the Utah chapter of the American Academy of Pediatrics. With 84 pediatricians participating in the survey, the program found that 56 pediatricians (two-thirds) had heard of the "Bulletproof Kids" campaign, while 28 (one-third) were not familiar with it. The survey also found that just over half of the pediatricians surveyed indicated that the campaign had positively affected how they counseled families on safe storage, while the other half reported that it had not affected their interaction with patients. The survey also provided insight on the extent to which the surveyed pediatricians ask the parents of patients about the presence of firearms in the home and method of storage. Accordingly, the results indicated that about 20 percent of the surveyed pediatricians routinely ask about firearms and storage in the home, while 40 percent sometimes ask and nearly 40 percent do not routinely ask.

In addition to evaluating their programs, the "ASK Campaign," "Bulletproof Kids" and Seattle Children's Hospital also tracked the scope of their efforts. For example, an official at the Brady Center indicated that "ASK Campaign" materials were distributed by 60,000 pediatricians to their patients and families. A "Bulletproof Kids" official stated that since the program's inception in 2013, it had distributed about 1,000 posters, 600 brochures, 1,000 gun locks, and put up 17 billboards in the state. Officials at Seattle Children's Hospital said that since December 2014, they distributed nearly 2,800 lock boxes and over 250 trigger locks at an average of 4 events per year.

Officials from the 13 remaining programs reported that they had not evaluated their efforts to promote safe storage, but in some cases, they could determine how many locking devices their programs distributed or the extent to which their educational materials were used. For example:

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- An official from the Arizona Firearm Injury Prevention Coalition—which provides cable locks to children’s hospitals, state health and human services offices, and the Arizona Chapter of the American Academy of Pediatrics—said that the program has given out over 13,000 cable locks since its inception in 2005.
  - “Project ChildSafe”—which is a national program sponsored by NSSF that provides free safety kits, including materials on safe storage and a cable gun lock to the public—has distributed 37 million safety kits across the United States, according to NSSF officials.<sup>50</sup>
  - The New Hampshire Firearms Safety Coalition’s “Gun Shop Project,” which partnered with local gun shop owners to distribute suicide-prevention brochures, posters, and hotline cards to its customers, included an effort to determine if the gun shops were carrying and providing the materials. Coalition officials stated that after conducting unannounced, in-person visits to nearly every gun shop in the state, they found that almost 50 percent of the 67 gun shops they visited had the coalition’s suicide-prevention resources available for customers in the store.

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## Agency Comments

We provided a draft of this report to DOJ, HHS, Interior, and VA for review and comment. DOJ, Interior, and VA did not provide any comments while HHS provided technical comments, which we incorporated as appropriate.

As agreed with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from its date. At that time, we will send copies to the Secretaries of the Departments of Health and Human Services, Interior, and Veterans Affairs, as well as the Attorney General of the United States. In addition, the report will be available at no charge on the GAO website at <http://www.gao.gov>.

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<sup>50</sup>One of the organizations we contacted indicated that one of its initiatives will include an evaluation component. NSSF recently launched an expansion of its Project ChildSafe initiative called Project ChildSafe Communities. According to DOJ, this initiative was based on a \$2,446,888 grant funded through the Justice Assistance Grant Program, which received, as part of its fiscal year 2015 appropriation, \$3 million for competitive grants to distribute firearm safety materials and gun locks. See Consolidated and Further Continuing Appropriations Act, 2015, Pub. L. No. 113-235, div. B, tit. II, 128 Stat. 2130, 2192 (2014). NSSF launched its program in Oklahoma City, Oklahoma. An evaluation of the program is expected in 2018.



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If you or your staff have any questions about this report, please contact me at (202) 512-7114 or [crossem@gao.gov](mailto:crossem@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix IV.

A handwritten signature in black ink, appearing to read "Marcia Crosse", with a long horizontal flourish extending to the right.

Marcia Crosse  
Director, Health Care

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*List of Requesters*

The Honorable Patty Murray  
Ranking Member  
Committee on Health, Education, Labor, and Pensions  
United States Senate

The Honorable Tammy Baldwin  
United States Senate

The Honorable Richard Blumenthal  
United States Senate

The Honorable Sherrod Brown  
United States Senate

The Honorable Benjamin L. Cardin  
United States Senate

The Honorable Thomas R. Carper  
United States Senate

The Honorable Richard J. Durbin  
United States Senate

The Honorable Dianne Feinstein  
United States Senate

The Honorable Kirsten Gillibrand  
United States Senate

The Honorable Mazie Hirono  
United States Senate

The Honorable Tim Kaine  
United States Senate

The Honorable Edward J. Markey  
United States Senate

The Honorable Robert Menendez  
United States Senate



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The Honorable Christopher Murphy  
United States Senate

The Honorable Jack Reed  
United States Senate

The Honorable Charles E. Schumer  
United States Senate

The Honorable Elizabeth Warren  
United States Senate

The Honorable Sheldon Whitehouse  
United States Senate

The Honorable Ron Wyden  
United States Senate

# Appendix I: Organizations Contacted

In addition to contacting agency officials at the Department of Health and Human Services (HHS), the Department of the Interior (Interior), the Department of Justice (DOJ), and the Department of Veterans Affairs (VA), we also contacted researchers and experts in the field of firearm safety and representatives from 22 organizations that either conduct research in this field or have campaigns or programs related to safe firearm storage, including medical associations, academic institutions, and a county government. Many of the safe storage campaigns or programs that we identified were largely funded privately through donations, but some programs received federal, state, or local funds. Those programs receiving federal grants are identified in appendix III. The organizations and their corresponding campaigns or programs related to safe storage (if applicable) are as follows:<sup>1</sup>

- **American Academy of Pediatrics (Bright Futures Curriculum)**
- American Medical Association
- **Arizona Firearm Injury Prevention Coalition**
- **Brady Center to Prevent Gun Violence (ASK Campaign; Suicide Proof Your Home)**
- **Bulletproof Kids**
- **Doctors for Responsible Gun Ownership**
- **Everytown for Gun Safety (Be SMART Campaign)**
- **Harvard Injury Control Research Center (Means Matter)**
- Johns Hopkins Center for Gun Policy and Research
- Johns Hopkins School of Public Health
- Joyce Foundation and Fund for a Safer Future
- **King County, Washington (Lok-It-Up)**
- **Law Center to Prevent Gun Violence**

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<sup>1</sup>Organizations with safe storage campaigns or programs are in bolded text.

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- **National Center for the Prevention of Community Violence**
  - **National Crime Prevention Council/Ad Council (Lock It Up)**
  - **National Rifle Association (Eddie Eagle)**
  - **National Shooting Sports Foundation (Project ChildSafe)**
  - **New Hampshire Firearm Safety Coalition (Gun Shop Project)**
  - Northeastern University
  - **Seattle Children's Hospital**
  - Smart Tech Challenges Foundation
  - University of Washington

## Appendix II: Firearm Safety Technologies

Personalized firearms—which are also referred to as “smart guns,” “user-authorized guns,” and “childproof guns”—can be an approach to firearm safety.<sup>1</sup> The Department of Justice’s (DOJ) National Institute of Justice (NIJ) defines personalized firearms as those that “utilize integrated components that exclusively permit an authorized user or set of users to operate or fire the gun and automatically deactivate it under a set of specific circumstances, reducing the chances of accidental or purposeful use by an unauthorized user.”<sup>2</sup> A representative of the Smart Tech Challenges Foundation, which funds firearm safety technology research and development, similarly described a personalized firearm as including a safety feature or features that allows it to fire only when activated by an authorized user. The representative added that such features can prevent misuse, accidental shootings, gun thefts, use of the weapon against the owner, and self-harm.

There are two main categories of smart gun technologies that may be included in a gun’s design or retrofitted to a traditional firearm:

- *Biometric technology.* Biometric authentication can be used as a form of identification and limit access to a firearm by using unique features of individuals—such as fingerprints or grip recognition—as the “key” to identify authorized users and deactivate a blocking mechanism to allow the firearm to discharge.
- *Radio frequency identification (RFID).* This technology uses a short-range electronic sensor. A radio chip responsible for gun access is placed in a gun handle, and a corresponding chip is placed on a ring, watch, or bracelet, or can even be implanted in an authorized shooter’s hand. In order for the firearm to discharge, it must be in close proximity to the corresponding chip, otherwise it will not fire. As

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<sup>1</sup>NIJ officials, a researcher, and a representative from the Smart Tech Challenges Foundation told us that terms such as “personalized guns,” “smart guns,” “user-authorized guns,” and “childproof guns” are generally, but not always, interchangeable.

<sup>2</sup>See Department of Justice, National Institute of Justice, *A Review of Gun Safety Technologies*, NCJ 242500 (Washington, D.C: June 2013).

soon as the chips are separated, the firearm will automatically lock again, not allowing it to fire.

An official from DOJ told us that these technologies—which are currently used in other products such as smartphones and security systems—have not been integrated into firearms that are currently on the market.

DOJ has had a role in supporting the development and integration of this technology in firearms through both NIJ and also its Bureau of Justice Assistance (BJA). DOJ officials indicated that they began looking into personalized firearms in the 1990s. In the 2000s, DOJ awarded at least \$12.9 million in grants through NIJ and BJA to firearm manufacturers for various efforts to incorporate the technology in firearms. (See app. III for more information about the grants awarded by DOJ.) In addition to awarding grants, DOJ has also reviewed the development of personalized firearms. NIJ released a report in June 2013 reviewing the status of gun safety technology.<sup>3</sup> This report listed three personalized firearms that were ready, or nearly ready, for commercial production: 1) a shotgun with an RFID ring,<sup>4</sup> 2) a handgun with an RFID wristband,<sup>4</sup> and 3) an add-on fingerprint sensor for a handgun.

In October 2015, NIJ issued the Gun Safety Technology Challenge—which was intended to test the reliability of prototypes for personal firearms and obtain a baseline of the status of the technology.<sup>5</sup> The challenge, which consisted of a three-stage evaluation of the reliability and durability of smart gun technology, received 14 submissions from developers, according to NIJ officials. However, these officials told us that 12 of the 14 submissions were ineligible because they were concepts

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<sup>3</sup>See *A Review of Gun Safety Technologies*, June 2013.

<sup>4</sup>Two officials we spoke with indicated that a firearm using the RFID wristband (the Armatix iP1, a .22 caliber pistol) was sold at two firearms retailers in California and one in Maryland in 2014. However, these retailers discontinued offering the product due to a negative response from customers.

<sup>5</sup>DOJ's Gun Safety Technology Challenge was discussed in a report that DOJ, the Department of Homeland Security, and the Department of Defense jointly issued in response to President Obama's January 2016 Memorandum on Promoting Smart Gun Technology. See *Report to the President Outlining a Strategy to Expedite Deployment of Gun Safety Technology* (Washington, D.C.: April 2016) and <http://www.nij.gov/guntechchallenge>, accessed on July 7, 2017.

rather than functional products.<sup>6</sup> Of the two remaining submissions, one applicant was determined to be ineligible, leaving only one other applicant. Due to the low response rate, NIJ terminated the challenge in 2016, prior to conducting any testing.

NIJ officials stated that they do not have plans to provide additional funding for the development of smart gun technologies. The officials considered the three personalized firearms mentioned in NIJ's *Review of Gun Safety Technologies* report to be fairly well developed, but said that these firearms were not federally funded. Previous federally funded efforts to incorporate personalized technologies did not reach the point of readiness for production, according to these officials. As the federal grants have ended, development of personalized firearm technology has primarily been privately funded. A representative of the Smart Tech Challenges Foundation and a researcher from Johns Hopkins University cited issues such as funding, reliability, and acceptance of personalized firearms among gun owners in the United States as challenges to development and production of personalized firearms for the mass market. DOJ officials told us that the reliability of existing personalized firearms is still unknown. However, NIJ published an interagency report in response to a January 2016 Presidential Memorandum. This report detailed voluntary baseline specifications on the reliability and other characteristics that would be needed in personalized firearms to meet the requirements of law enforcement.<sup>7</sup>

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<sup>6</sup>In contrast, a representative from the Smart Tech Challenges Foundation stated that the foundation includes concepts in its calls for proposals. The representative told us that the foundation received a large response from developers who were at different stages of development and who designed products such as safes and barrel locks that incorporated user-authorized technologies, in addition to smart guns. The representative also noted that, in the foundation's view, it is too early in the development process to require submission of a functional product.

<sup>7</sup>In November 2016, NIJ issued *Baseline Specifications for Law Enforcement Service Pistols With Security Technology*, NCJ 250377 (Washington, D.C.: 2016).

# Appendix III: Federal Efforts to Promote Firearm Safety

The federal agencies that we contacted—the Departments of Health and Human Services (HHS), Interior, Justice (DOJ), and Veterans Affairs (VA)—have various efforts to promote firearm safety. Such efforts primarily consist of awarding grants to promote firearm safety, including researching firearm safety, developing smart gun technology, producing informational materials or public service announcements, and implementing firearm safety programs. (See table 1.) Some of the HHS grants were for developing firearm safety educational materials and interventions, and studying risky firearm behaviors. Interior has funded grants for hunter education programs that include safety information. In the late 1990s and early 2000s, the grants from DOJ focused on the development of smart gun technology, but more recent grants are for the implementation and evaluation of firearm safety education and lock distribution programs. Aside from awarding grants, DOJ and VA also had other efforts to promote firearm safety, such as programs that provide safety materials and background checks on prospective gun buyers. (See table 2.)

Table 1: Federal Grants Related to Firearm Safety that GAO Identified

Department	Agency	Date(s)	Amount	Recipient	Purpose
Department of the Interior	FWS	1970-present	Amount varies by state based on statutory formula	Hunter education programs in all states and territories except Washington, D.C.	To provide grants to states for programs that instruct in firearm operations and safety, among other hunting-related skills and knowledge
Department of Justice	BJA	2013	\$1,000,000	National Crime Prevention Council	To fund the “Lock It Up” program, which includes public service announcements that encourage gun owners to store their guns safely
Department of Justice	BJA	2015	\$2,466,888	National Shooting Sports Foundation	To expand “Project ChildSafe,” a program that promotes firearm safety and distributes gun locking devices
Department of Justice	BJA and NIJ	2004-2014	\$4,020,293	New Jersey Institute of Technology	To develop a personalized firearm unlocked by pressure sensors on the grip
Department of Justice	NIJ	1997-2000	\$500,079	Colt’s Manufacturing Co.	To develop a firearm with a radio frequency identification (RFID) wristband; two prototypes were delivered

**Appendix III: Federal Efforts to Promote  
Firearm Safety**

Department of Justice	NIJ	2000-2005	\$3,673,361	Smith & Wesson	To explore various types of firearm authentication such as PIN codes, fingerprint sensors, and skin tissue spectroscopy; two prototypes were delivered
Department of Justice	NIJ	2000-2006	\$3,606,156	FN Manufacturing, Inc.	To develop a firearm unlocked with an RFID ring; three prototypes were delivered
Department of Justice	NIJ	2002	\$1,147,353 <sup>a</sup>	iGun Technology, Exponent, Mosermation, Technology Next, and VLe Small Arms	For gun manufacturers to develop smart gun technologies
Department of Justice	NIJ	2013	\$1,025,560	University of Colorado-Denver	To study an intervention, delivered in a health care setting, designed to decrease home firearm access by youth
Department of Justice	NIJ	2015	\$199,607	RAND Corporation	For an evaluation of the National Shooting Sports Foundation's "Project ChildSafe." (See above.)
Department of Health and Human Services	CDC	2012-2015	\$22,400	Colorado Injury Control Research Center	For an emergency department based program that provides counseling on firearms to prevent adolescent suicide
Department of Health and Human Services	CDC	2015-2016	\$40,000	Oregon State University	To identify culturally competent language and public health approaches for promoting firearm safety in rural primary care settings with patients at risk of suicide and their families
Department of Health and Human Services	CDC	1995	\$100,000	Northwest Media, Inc.	To produce media-based education for parents on firearm safety
Department of Health and Human Services	NIH	2002-2005	\$2,565,491	University of Pennsylvania	To study the relationship between alcohol outlets and firearm violence
Department of Health and Human Services	NIH	2015-2016	\$437,910	University of Colorado Denver	To examine the adoption in the Mountain West of emergency department discharge practices that include counseling on limiting access to firearms during times of mental health crisis
Department of Health and Human Services	NIH	2016	\$182,304	University of Michigan	To study technology-enhanced behavioral interventions to decrease youth substance misuse and high-risk firearm behaviors
Department of Health and Human Services	NIH	2016	\$186,437	University of New Hampshire	To develop a national youth firearm risk and safety assessment tool



**Appendix III: Federal Efforts to Promote  
Firearm Safety**

Department of Health and Human Services	NIH	2016	\$229,477	Oregon Health and Science University	To link data between federal and state agencies to allow analysis of rates, risk factors, and circumstances of firearm-related injuries and deaths among veterans
Department of Health and Human Services	NIH	2016	\$240,499	University of Pennsylvania	To develop implementation strategies for firearm-related suicide prevention in pediatric primary care

Sources: Data and interviews with the Bureau of Justice Assistance (BJA); Centers for Disease Control and Prevention (CDC); Fish and Wildlife Service (FWS); National Institutes of Health (NIH); National Institute of Justice (NIJ) | GAO-17-665

<sup>a</sup>These were individual grants as follows: iGun Technology (\$299,389), Exponent (\$187,598), Mosermation (\$299,510), Technology Next (\$175,856), and VLe Small Arms (\$185,000).

**Table 2: Federal Programs for Firearm Safety**

Department	Agency	Program type	Summary
Department of Justice	ATF	safety materials	Publishes materials on firearm safety and documenting transfer of firearms between private individuals
Department of Justice	FBI	National Instant Criminal Background Check System	Has been used since 1998 to determine if a prospective buyer is eligible to purchase a firearm
Department of Justice	NIJ	technology challenge	The Gun Safety Technology Challenge began in 2015 and was suspended in 2016
Department of Veterans Affairs	VHA	lock distribution	Distributed more than 2 million gun locks at VA facilities
Department of Veterans Affairs	VHA	counseling	Piloted lethal means counseling training for VA providers at the San Francisco VA
Department of Veterans Affairs	VHA	safety materials	Publishes gun safe storage materials
Department of Veterans Affairs	VHA	research	Conducted research on firearm safety and suicide risk in 2012

Sources: Data and interviews with the Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF); Bureau of Justice Assistance (BJA); Federal Bureau of Investigation (FBI); National Institute of Justice (NIJ); and Veterans Health Administration (VHA) | GAO-17-665

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# Appendix IV: GAO Contact and Staff Acknowledgments

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## GAO Contact

Marcia Crosse, (202) 512-7114, [crossem@gao.gov](mailto:crossem@gao.gov)

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## Staff Acknowledgments

In addition to the individual named above, other key contributors to this report were Geri Redican-Bigott (Assistant Director), JoAnn Martinez-Shriver (Analyst-in-Charge), Alexander Cattran, and Kelsey Wilson. Also contributing were Sam Amrhein, Rebecca Hendrickson, Jenny Rudisill, and Emily Wilson.

# Appendix V: Accessible Data

## Data Tables

**Accessible Data for Figure 1: Age-adjusted Rates of Firearm-Related Deaths and Non-fatal Injuries in the United States, 1990 through 2015**

Year	Firearm-related death rate (age-adjusted)	Non-fatal firearm-related injury rate (age-adjusted)
1990	14.51	n/a
1991	14.82	n/a
1992	14.46	n/a
1993	15	n/a
1994	14.45	n/a
1995	13.38	n/a
1996	12.57	n/a
1997	11.84	n/a
1998	11.09	n/a
1999	10.3	n/a
2000	10.11	n/a
2001	10.31	21.68
2002	10.43	20.16
2003	10.28	22.34
2004	9.98	21.79
2005	10.26	23.43
2006	10.22	23.61
2007	10.23	23.04
2008	10.23	25.77
2009	10.05	21.68
2010	10.07	23.97
2011	10.16	23.63
2012	10.44	25.85
2013	10.37	26.76
2014	10.25	25.47
2015	11.01	26.55

**Accessible Data for Figure 2: Firearm-related Deaths in the United States by Manner of Death, 2015**

Suicide	Homicide and legal intervention	Unintentional deaths	Undetermined intent
22018	13463	489	282

**Accessible Data for Figure 3: Age-adjusted Rates of Firearm-related Suicides in the United States, 1999 through 2015**

Year	Firearm-related suicide rate (age-adjusted)
1999	5.96
2000	5.88
2001	5.9
2002	5.91
2003	5.77
2004	5.65
2005	5.66
2006	5.54
2007	5.63
2008	5.82
2009	5.92
2010	6.06
2011	6.15
2012	6.29
2013	6.37
2014	6.35
2015	6.48

**Accessible Data for Figure 4: Rates of Firearm-related Deaths and Suicides in Children, Under Age 18, in the United States, 1999 through 2015**

Year	All Firearm Deaths 0-17 years olds	Firearm Suicide Deaths 10-17 years old
1999	2.47	1.73
2000	2.13	1.64
2001	1.97	1.36
2002	1.98	1.27
2003	1.8	1.12

Year	All Firearm Deaths 0-17 years olds	Firearm Suicide Deaths 10-17 years old
2004	1.88	1.14
2005	2.02	1.22
2006	2.15	1.11
2007	2.04	0.97
2008	1.98	1.1
2009	1.87	1.23
2010	1.8	1.11
2011	1.77	1.34
2012	1.77	1.37
2013	1.71	1.48
2014	1.81	1.6
2015	1.98	1.7

#### Accessible Data for Figure 5: Examples of Firearm Locking Devices

- **Cable Lock**

A cable lock is placed through the gun chamber or magazine well to prevent loading and firing. It is unlocked with a combination or key.

*Price range: \$10 to \$50*

- **Trigger Lock**

A trigger lock goes through the trigger guard behind the trigger, preventing the trigger from being pulled. It can be unlocked with a push-button keypad, combination or key.

*Price range: \$5 to \$35+*

- **Firearm Safe**

Firearm safes vary in size and level of protection with some large enough to store rifles and shotguns as well as handguns. Safes may have a key, combination lock, or digital keypad.

*Price range: \$100 to \$2,000+*

- **Lock Box**

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Lock boxes are small safes that use a key or combination lock. Some lock boxes use a digital keypad or biometric sensors, such as fingerprint readers, so that they may be opened quickly.

*Price range: \$40 to \$200+*

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**Accessible Data for Figure 6: Images from Various Safe Firearm Storage Campaign Materials**

- The Department of Veterans Affairs' Veterans Crisis Line provides brochures, posters, and a video on firearm safety, which stress the importance of storing firearms in the home safely, particularly when individuals are feeling depressed or hopeless.
- One of the National Crime Prevention Council's Lock It Up campaign posters depicts a child accessing an unsecured firearm in the home.
- An image from the Bulletproof Kids program depicts a young individual at risk for suicide as well as statistics on the incidence of firearm-related suicide in the state.
- The National Shooting Sports Foundation's "Own It? Respect It. Secure It." initiative is a companion to the Project ChildSafe program and was developed to give industry members an ongoing platform to promote and encourage firearm safety and storage.

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